



## 2. NUCLEAR WASTE POLICY ACT

### 2 (100)

#### **Comment** - 37 comments summarized

Commenters stated that the EIS must recognize that the repository design has “evolved” from a multiple barrier system with a primary reliance on natural barriers to a repository design with primary reliance on an engineered barrier system. They believe DOE is violating the Nuclear Waste Policy Act’s fundamental concept that the geologic setting be the principal barrier to waste reaching the environment, with engineered barriers providing only redundancy. They noted that the geologic formation at Yucca Mountain is now given almost no credit for isolating the waste, and that this change has effectively negated the purpose for considering the Yucca Mountain site. Commenters also noted that engineered barriers cannot ensure isolation of the waste for an adequate period. They believe that the EIS must prove beyond a doubt that radioactive material can be completely isolated or the project should be stopped.

#### **Response**

The repository design has evolved to reflect ongoing evaluations and other factors such as public comments and design- and performance-related reviews by external organizations, such as the Nuclear Waste Technical Review Board. If the Yucca Mountain site was approved and licensed for construction, the final design would balance the waste isolation abilities and associated uncertainties of the natural system with those of the engineered barrier system, based on an evaluation of their total system performance.

DOE believes that achieving this balance is in keeping with the NWPA. The Act directs DOE to investigate and potentially develop a permanent geologic repository for spent nuclear fuel and high-level radioactive waste in a deep subsurface location that would provide a reasonable assurance of adequate protection for the public and the environment. The Act encourages, rather than limits or otherwise prohibits, the use of engineered barriers for a geologic repository at Yucca Mountain by directing the Nuclear Regulatory Commission to develop criteria that would provide for the use of multiple barriers in the design of the repository [42 U.S.C. 10141(b)(1)(B)]. The Commission incorporated in its criteria (10 CFR Part 63) the requirement that the repository be predicated on the use of both natural and engineered barriers to enhance the resiliency of the repository and increase confidence that performance objectives would be met.

Given the current state of technology, it is impossible to design and construct a geologic repository that would provide a reasonable expectation that there would never be any releases of radioactive materials. However, DOE would design, construct, operate and monitor, and eventually close a repository that would meet public health and safety and radiation protection standards and criteria established by the Environmental Protection Agency and the Nuclear Regulatory Commission. Congress, in the Energy Policy Act of 1992, directed the Agency to develop public health and safety standards for the protection of the public from releases from radioactive materials stored or disposed of in a repository at the Yucca Mountain site. Congress also directed the Commission to publish criteria for licensing the repository that would be consistent with the radiation protection standards established by the Agency. These standards (40 CFR Part 197) and criteria (10 CFR Part 63) prescribe radiation exposure limits that the repository, based on a performance assessment, cannot exceed during a 10,000-year period after closure.

In this EIS, DOE has assessed the ability of the natural and engineered barriers system to isolate radioactive materials from the environment for thousands of years, and DOE would expect repository releases to the accessible environment to be orders of magnitude less than the prescribed radiation exposure limits during the 10,000-year period after closure. Based on the repository design and performance assessment, DOE believes that releases of radioactive materials for the first 10,000 years after repository closure would be limited, the result of incorporating a small number of waste package failures due to manufacturing defects into the Total System Performance Assessment.

DOE estimates that the peak annual individual dose to a hypothetical individual would not occur until about 410,000 years after closure and would be 620 (95<sup>th</sup> percentile peak dose). The mean peak annual individual dose within 1 million years was calculated to be 150 millirem at 480,000 years. On this basis, DOE has concluded that the repository would provide a high degree of long-term isolation of spent nuclear fuel and high-level radioactive waste.

## 2 (126)

### **Comment** - 8 comments summarized

Commenters stated that the Proposed Action of constructing, operating and monitoring, and eventually closing a geologic repository at Yucca Mountain violates the Nuclear Waste Policy Act. One commenter stated that the statement on Page 2-86 of the DEIS, "In addition, DOE might not complete some of the studies and design development for the repository until after it has issued the Final EIS" is not consistent with the requirements of the NWP. The commenter also stated that the Draft EIS was insufficient pursuant to the NEPA. One commenter stated that DOE must also be in compliance with the National Environmental Policy Act.

### **Response**

The Nuclear Waste Policy Act of 1982 established a process for selecting sites for technical study as potential geologic repository locations. In accordance with this process, DOE identified nine candidate sites, the Secretary of Energy nominated five of the nine sites for further consideration and DOE issued environmental assessments for the five sites. DOE recommended three of the five sites, of which Yucca Mountain was one, for study as repository site candidates. In 1987, Congress amended the Nuclear Waste Policy Act of 1982 directing the Secretary of Energy to perform site characterization activities at the Yucca Mountain site, and, if the site is found suitable, make a recommendation to the President on whether to approve the site for development of a repository. Any approval recommendation is required to be accompanied by a final environmental impact statement.

The purpose of the National Environmental Policy Act is to promote an understanding of environmental consequences of Federal actions prior to their implementation. It requires Federal agencies to disclose to the public and agency decisionmakers the potential extent of environmental harm and any environmental benefits from the proposed action. The NWP addresses how certain National Environmental Policy Act requirements apply to the proposed Yucca Mountain repository. In particular, the NWP specifies that it is not necessary to consider in the EIS the need for a repository, alternatives to geologic disposal, or alternative sites to Yucca Mountain. Although the Act does not require an evaluation of alternatives to a repository in this EIS, DOE evaluated a No-Action Alternative to provide a baseline for comparison with the Proposed Action.

DOE, as directed by Congress in the NWP, has complied and will continue to comply with all applicable regulations and guidelines during the process to determine the suitability of the Yucca Mountain site as a potential geologic repository. DOE believes that the EIS is consistent with NWP and NEPA requirements. The level of information and analyses, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of bounding assumptions if information was incomplete or unavailable and if there were uncertainties, provide a meaningful assessment of environmental impacts consistent with the requirements.

## 2 (127)

### **Comment** - 2 comments summarized

Commenters expressed concern that the Nation might commit a large amount of resources to a repository at Yucca Mountain, yet they stated that it will be only a temporary solution.

### **Response**

As described in Chapter 1 of the EIS, Congress enacted the Nuclear Waste Policy Act of 1982 establishing the Federal Government's responsibility to provide permanent disposal of the Nation's spent nuclear fuel and high-level radioactive waste. Section 111(a)(7) of the Act states that the Federal Government must take precautions to ensure that these materials do not adversely affect public health and safety and the environment [42 U.S.C. 10131(a)(7)].

Given the current state of technology, it is impossible to design and construct a geologic repository that would provide a reasonable expectation that there would never be any releases of radioactive materials. However, DOE would design, construct, operate and monitor, and eventually close a repository that would meet public health and safety radiation protection standards and criteria established by the Environmental Protection Agency and the Nuclear Regulatory Commission. Congress, in the Energy Policy Act of 1992, directed the EPA to develop public health and safety standards for the protection of the public from releases from radioactive materials stored or disposed of in a repository at the Yucca Mountain site. Congress also directed the NRC to publish criteria for licensing the repository that would be consistent with the radiation protection standards established by the Agency.

In part, these standards (40 CFR Part 197) and criteria (10 CFR Part 63) prescribe radiation exposure limits that the repository, based on a performance assessment, cannot exceed during a 10,000-year period after closure.

Pursuant to 10 CFR Part 63, if the repository was constructed, DOE would submit an application to the Nuclear Regulatory Commission for a license amendment to close the repository sometime between 2060 and 2333. This application would be accompanied by such information as an update of the repository's performance assessment and a detailed postclosure monitoring program. If the Commission issued that license amendment, DOE would close the repository permanently (see Section 2.1.2 of the Final EIS).

## **2 (132)**

### **Comment** - 5 comments summarized

Commenters asked for additional description and analysis of the effectiveness and feasibility of the active and passive institutional controls described for use at the proposed repository. One commenter recommends that the Final EIS clarify the extent to which the Energy Policy Act of 1992 requires active institutional control of the Yucca Mountain site and estimate the environmental impacts associated with a scenario that incorporates such control. Another commenter believes that the passive institutional control of the Proposed Action and the No-Action Alternative provide for only 100 years of monitoring, which the commenter stated is illogical given the known half-life of the emplaced materials. The same commenter stated that the EIS is insufficient because the postclosure monitoring period is inadequate.

### **Response**

DOE understands that ensuring public safety requires continued stewardship and has developed programs to ensure the long-term safety after closure. These programs would include, but would not be limited to, long-term monitoring of the site and maintaining the integrity and security of the proposed repository.

After repository closure, DOE would be responsible for maintaining institutional control over the repository, consistent with the Energy Policy Act of 1992. Neither the extent nor the length of this regulatory requirement is well defined at present. However, DOE intends to maintain appropriate institutional controls for as long as necessary.

DOE would design and implement a postclosure monitoring program consistent with the Nuclear Regulatory Commission regulations at 10 CFR Part 63. Prior to repository closure, DOE would submit a license amendment application to the Nuclear Regulatory Commission for review and approval. The license amendment application would include, among several items:

1. An update of the assessment of the repository performance for the period after closure
2. A description of the postclosure monitoring program
3. A detailed description of the measures to be employed to regulate or prevent activities that could impair the long-term isolation of the spent nuclear fuel and high-level radioactive waste, and to preserve relevant information for use by future generations

The application also would describe DOE's proposal for continued oversight to prevent any activity at the site that would pose an unreasonable risk of breaching the repository's engineered barriers, or increase the exposure of individual members of the public to radiation beyond limits allowed by the Nuclear Regulatory Commission. This final EIS describes the types of monitoring and other institutional controls that would be contemplated; however, the details of this program would be defined during the consideration of the license amendment application for closure. This would allow DOE to take advantage of new technological information.

For impact analysis purposes only, the EIS assumed that passive institutional controls would be applied after repository closure, as described in Section 2.1.2.4. DOE chose to analyze passive institutional controls for the

postclosure period based on recommendations by the National Research Council of the National Academy of Sciences (consistent with the Energy Policy Act). The National Research Council concluded that:

“...because it is not technically feasible to assess the probability of human intrusion into a repository over the long term, we do not believe that it is scientifically justified to incorporate alternative scenarios of human intrusion into a fully risk-based compliance assessment that requires knowledge of the character and frequency of various intrusion scenarios.” (DIRS 100018-National Research Council 1995)

The National Research Council recommended that the only human intrusion scenario to be considered is inadvertent drilling into the repository. DOE analyzed this scenario and described the results in Section 5.7.1 of the EIS. DOE believes that passive institutional controls such as land records and warning systems used for postclosure impact analyses are commensurate with the recommendation of the National Research Council. Moreover, the Environmental Protection Agency has adopted the National Research Council’s intrusion principle in Agency regulations at 40 CFR Part 197. The Nuclear Regulatory Commission licensing criteria for a repository at Yucca Mountain (10 CFR Part 63) also adopt the recommendations of the National Research Council with regard to human intrusion.

The EIS assumed active institutional controls for at least 50 years and possibly more than 300 years under both the Proposed Action and Scenario 2 of the No-Action Alternative. After this time, it was assumed that passive institutional controls would be applied because the repository would be closed and active institutional control would end under No-Action Alternative Scenario 2. Because the impacts due to postclosure passive institutional controls would be less than those analyzed for the active control period, the EIS analyses have represented the range of impacts.

## **2 (169)**

### **Comment** - 2 comments summarized

A commenter stated that designating indefinite onsite storage as the No-Action Alternative would render it a major Federal action. The commenter stated that the 77 sites that would continue to manage spent nuclear fuel and high-level radioactive waste under the No-Action Alternative should qualify under Sections 116, 117 (b), and 118 of the Nuclear Waste Policy Act for Federal grants to perform timely and essential analyses not completed by DOE and the Nuclear Regulatory Commission. The commenter also said that considerations that have been extended to Nevada and second-site candidates should be extended to states, tribes, and communities near the 72 commercial and 5 DOE storage sites. The commenter stated that these grant opportunities must be provided immediately on the issuance of the Final EIS if it maintains the No-Action Alternative without the additional evaluation requested.

### **Response**

As stated in Section 2.2 of the EIS, DOE recognizes that neither No-Action Scenario would be likely to occur in the event of a decision not to develop a repository at Yucca Mountain. The Department included the two scenarios in the EIS to provide a basis for comparison to the impacts from the Proposed Action, and because they reflect a range of impacts that could occur. Sections 116 through 118 of the Nuclear Waste Policy Act concern coordination with State and tribes affected by the identification and study of potentially acceptable sites for a repository. By the terms of the NWPA, “repository” is defined as “any system... that.. may be used for the permanent deep geologic disposal of high-level radioactive waste and spent nuclear fuel.” The 77 sites covered under the No-Action Alternative do not qualify as potential repository sites and, therefore, Federal grants would not be available to affected entities, states, tribes, or communities near those sites for additional analyses.

## **2 (505)**

### **Comment** - EIS000097 / 0002

Each nuclear plant that operates must take responsible action in handling the waste that comes from their plant and not leave it to some unknown handlers to do their work. Where one is responsible, there is usually much better handling.

### **Response**

As described in Chapter 1 of the EIS, Congress has determined through passage of the Nuclear Waste Policy Act of 1982 that the Federal Government has the responsibility to dispose of spent nuclear fuel and high-level radioactive waste permanently and to ensure that these materials do not adversely affect this and future generations.

**2 (828)**

**Comment** - EIS000218 / 0001

As you progress in making the final decision about Yucca Mountain based on this EIS, I want to reiterate that the U.S. Government, through the DOE, has a legal obligation to build and operate a central repository for spent fuel from commercial reactors and for the high level waste generated from the production of our nuclear weapons. This process has taken exceedingly too long.

**Response**

Chapter 1 of the EIS explains that the Nuclear Waste Policy Act of 1982 established the Federal Government's responsibility to provide a permanent disposal of the Nation's spent nuclear fuel and high-level radioactive waste and set forth a process and schedule for disposal of these materials in a geologic repository. In 1987, Congress amended the Nuclear Waste Policy Act and directed DOE to determine whether Yucca Mountain is suitable for a geologic repository.

The DOE schedule for determining whether to recommend that the President approve the Yucca Mountain site for a monitored geologic repository depends primarily on the completion of site characterization activities. DOE is responsible for the ultimate disposition of spent nuclear fuel and high-level radioactive waste and needs to make its determination expeditiously. However, the Department will not rush to do so in the absence of needed information. If DOE recommended the site to the President, and if the President recommended the site to Congress, and if Congress approved the site, if necessary, DOE would not begin shipments of nuclear waste to Yucca Mountain until the Nuclear Regulatory Commission issued a construction authorization and a license to operate the repository.

**2 (868)**

**Comment** - EIS000252 / 0002

It is important because we don't have a decent waste policy within this country. So, I think that DOE needs to step back, and take another look, and rethink what the nuclear waste policy really is. And it shouldn't be the shell game. And it shouldn't be the one biggest, best hole in the ground, whether that [be in] New Mexico or Nevada.

Not having an overall nuclear waste policy is some of the biggest problems that are within the Department of Energy.

**Response**

Geologic disposal of radioactive waste has been the focus of scientific research for more than 40 years. As early as 1957, a National Academy of Sciences report to the Atomic Energy Commission (a DOE predecessor agency) recommended burying radioactive waste in geologic formations (DIRS 100011-NAS 1957). In 1976, the Energy Research and Development Administration (another predecessor agency) began investigating geologic formations and considering different disposal concepts, including deep-seabed disposal, disposal in the polar ice sheet, and rocketing waste into the sun. Based on the results of these investigations and the analyses of the *Final Environmental Impact Statement Management of Commercially Generated Radioactive Waste* (DIRS 104832-DOE 1980), DOE determined in a Record of Decision (46 FR 26677, May 14, 1981) that it would pursue mined geologic disposal. In passing the Nuclear Waste Policy Act of 1982, as amended in 1987, Congress determined that decades of research had been sufficient to conclude that a geologic repository was the safest alternative for waste disposal (see Section 1.3 of the EIS for additional information).

Virtually every expert group that has examined the disposal of high-level radioactive waste has agreed that a geologic repository is the best approach. For example, a panel of the National Academy of Sciences noted in 1990 that there is a worldwide scientific consensus that deep geologic disposal is the best option for disposing of high-level radioactive waste (DIRS 100061-National Research Council 1990). Their May 2001 report, *Disposition of High-Level Waste and Spent Nuclear Fuel: The Continuing Societal and Technical Challenges* (DIRS 156712-National Research Council 2001), reaffirms this position. The National Research Council maintains that "geologic disposal remains the only scientifically and technically credible long-term solution available to meet the need for safety without reliance on active management." This long-term solution would minimize the burden placed on future generations and provide the greatest degree of security from outsiders.

In 1987, Congress amended the Nuclear Waste Policy Act and directed DOE to determine whether Yucca Mountain is suitable for a geologic repository. In response, DOE conducted a series of investigations and evaluations (the site

characterization program) to assess the suitability of the Yucca Mountain site as a potential geologic repository. The investigations and evaluations consisted of scientific, engineering, and technical studies (see Section 1.4.3.1 of the EIS). In addition, various independent entities including the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, and the State of Nevada and affected units of local government have reviewed the results of the site characterization program. The results of the program have provided information for this EIS and other DOE documents.

## **2 (1097)**

**Comment** - EIS000162 / 0004

The “No Action Alternative” violates the NWP [Nuclear Waste Policy Act] by not removing the waste to a centralized repository.

### **Response**

The NWP specifies that it is not necessary for this EIS to consider the need for a repository, alternatives to geologic disposal, or alternative sites to Yucca Mountain. However, DOE chose to evaluate a No-Action Alternative to serve as a basis for comparing the magnitude of potential impacts with those of the Proposed Action.

If the President or Congress did not approve Yucca Mountain, DOE would prepare a report to Congress. That report, required by the NWP, would contain recommendations for further action to ensure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for new legislative authority. Other than this action, the future course that Congress, DOE, and the commercial nuclear power utilities would take is uncertain. In light of these uncertainties, DOE decided to illustrate one set of possibilities by focusing its No-Action Alternative analysis on the potential impacts of two scenarios: long-term storage of spent nuclear fuel and high-level radioactive waste at the current sites with effective institutional control for at least 10,000 years, and long-term storage with no effective institutional control after 100 years. Although neither of these scenarios is likely, DOE selected them for analysis because they provide a basis for comparison to the impacts of the Proposed Action and because they reflect a range of impacts that could occur.

## **2 (1244)**

**Comment** - EIS001888 / 0348

[Clark County summary of comments it has received from the public.]

Many commenters requested that DOE restructure the EIS’s proposed action and alternatives stating that the NWP [Nuclear Waste Policy Act] does not preclude DOE from examining: (1) the need for the repository, (2) alternatives to geologic disposal (including recycling, storing wastes at the vitrification site, developing methods of waste remediation and destruction, using the waste for beneficial purposes, and launching the waste into space), (3) alternative sites to Yucca Mountain (including at-reactor dry-cask storage, interim storage, leaving foreign wastes in countries that generate the wastes thereby linking nuclear proliferation with the consequences of waste disposal), and (4) the timing of repository availability. Consistent with this restructuring, commenters suggested that the EIS evaluate the disposal of more than 70,000 MTHM [metric tons of heavy metal], alternatives if less than 70,000 MTHM are disposed [of], the likelihood of a second repository, the disposal of additional wastes (surplus plutonium, highly enriched uranium, Greater than Class [C]), and the impacts of developing a low-level waste repository at Yucca Mountain. In contrast, other commenters said the Congressional intent not to require such analyses in the EIS should be followed, waste forms examined should be limited to SNF [spent nuclear fuel] and HLW [high-level radioactive waste], and that the no-action alternative should not be examined.

### **Response**

As discussed in Section 1.5 of the EIS, the NWP includes four provisions relevant to the EIS. Under the Act, the Secretary of Energy is not required to consider (1) the need for a geologic repository, (2) the time at which the repository could become available, (3) alternatives to isolating materials in a repository, and (4) any site other than Yucca Mountain for repository development.

Section S.6.1 of the EIS Summary explains that comments received from the public during the scoping process expressed the concern that commercial and DOE facilities would produce more spent nuclear fuel and high-level radioactive waste than the 70,000 metric tons of heavy metal (MTHM) accounted for in the Proposed Action. In response to these comments, DOE analyzed the cumulative impacts of emplacing additional inventories in the

repository (Inventory Modules 1 and 2). Chapter 8 describes the impacts of emplacing additional waste in the repository. DOE recognizes that the emplacement of more than 70,000 MTHM in a repository at Yucca Mountain would require legislative action by Congress.

**2 (1339)**

**Comment** - EIS000219 / 0004

Using engineered and natural barriers, the Yucca Mountain repository will protect public health and safety and the environment for years to come.

**Response**

DOE is designing the proposed repository to use natural and engineered barrier systems that would ensure the containment of radioactive contamination for as long as possible. DOE believes it can design a containment system that the Nuclear Regulatory Commission will find, with “reasonable expectation,” would protect public health and safety and the environment.

**2 (3882)**

**Comment** - EIS001343 / 0001

For the past 20 years I have been attending the hearings about waste storage at Yucca Mountain. I am convinced that the DOE should become a bystander while an assortment of governmental and corporate representatives as well as a large cross-section of the citizenry discuss and come to an agreement about the best way to store this terrible waste.

**Response**

In 1982, Congress, in passing the Nuclear Waste Policy Act, determined that deep geologic disposal is the appropriate way to dispose of spent nuclear fuel and high-level radioactive waste. Under that Act, as amended in 1987, Congress directed DOE to determine whether Yucca Mountain is a safe place to develop a geologic repository. The Department must act in accordance with the law. If the Yucca Mountain site is approved and licensed by the Nuclear Regulatory Commission, DOE would then be responsible for constructing, operating and monitoring, and closing the repository.

**2 (5041)**

**Comment** - EIS001520 / 0009

The description of the proposed action indicates that active institutional controls (e.g., monitored and enforced limitations on site access) would be applied to the Yucca Mountain site only until permanent closure of the repository has been completed. This seems contrary to the provision of the Energy Policy Act of 1992 that directs the Secretary of Energy to “continue to oversee the Yucca Mountain site to prevent any activity at the site that poses an unreasonable risk....” The oversight mandated by the Energy Policy Act appears to require some degree of active institutional control of the site, which would cause environmental impacts not evaluated in the draft EIS. The [Nuclear Waste Technical Review] Board recommends that the final EIS clarify the extent to which active institutional control of the Yucca Mountain site may be required by the Energy Policy Act, and estimate the environmental impacts that would be associated with a scenario that incorporates such control.

**Response**

The Energy Policy Act of 1992 directed the National Academy of Sciences to conduct a study to provide findings and recommendations on reasonable standards for the protection of the public health and safety by including “whether it is reasonable to assume that a system for post-closure oversight of the repository can be developed based upon active institutional controls, that will prevent an unreasonable risk of breaching the repository’s engineered barriers or increasing individual members of the public to radiation beyond allowable limits” [Section 801(b)].

The National Research Council (jointly managed by the National Academy of Sciences and the National Academy of Engineering for the purpose of conducting such studies) concluded that it is not reasonable to assume that a system for postclosure oversight of a repository based on active institutional control could be developed that would prevent an unreasonable risk of breaching the repository’s engineered barriers (DIRS 100018-National Research Council 1995). The Academy based this conclusion on the absence of any scientific basis for making long-term projections of the social, institutional, or technological status of future societies. It also concluded that there is no technical basis for making forecasts about the long-term reliability of passive institutional controls, such as markers,



monuments, and records. However, the Academy went on to say that while there is no scientific basis for judging whether active institutional control could prevent an unreasonable risk of human intrusion, a collection of prescriptive requirements including active institutional control, recordkeeping, and passive barriers and markers would help reduce the risk of human intrusion at least in the near term.

DOE agrees with the National Academy of Sciences conclusions and believes it prudent to consider some forms of institutional control. Section 2.1.2 of the EIS and Sections 2.5, 4.1.5, and 4.6 of the Science and Engineering Report (DIRS 153849-DOE 2001) describe institutional controls such as land records and warning systems, monuments to delineate the repository area, and a program of continued oversight to prevent any activity that would pose an unreasonable risk of breaching the engineered barrier. The establishment and maintenance of postclosure institutional control would be consistent with the postclosure monitoring program described in 10 CFR 63.102. The details of this program would be defined during the process of the license amendment for permanent closure. DOE expects the direct environmental impacts associated with the long-term monitoring program would be small, consistent with the impacts associated with other monitoring programs such as the Early Warning Drilling Program DOE is conducting in cooperation with Nye County.

**2 (5429)**

**Comment** - EIS001887 / 0128

Page 2-69; Section 2.3.1 - Alternatives Addressed Under the Nuclear Waste Policy Act

The Draft EIS should not consider any plan to emplace more than 70,000 MTHM [metric tons of heavy metal] at Yucca Mountain for the reason stated in the third paragraph of this section, i.e., the NWPA [Nuclear Waste Policy Act] prohibits this action. Therefore, the discussion of this plan in Section 8 should be removed from the Draft EIS.

**Response**

Section S.6.1 of the EIS Summary explains that comments received from the public during the scoping process expressed the concern that generating facilities would produce more spent nuclear fuel and high-level radioactive waste than the 70,000 metric tons of heavy metal (MTHM) accounted for in the Proposed Action. In response to these comments, DOE analyzed the cumulative impacts of emplacing additional inventories in the repository (Inventory Modules 1 and 2). Chapter 8 describes the impacts of emplacing additional waste in the repository. DOE recognizes that the emplacement of more than 70,000 MTHM in a repository at Yucca Mountain would require legislative action by Congress or the availability of a second repository.

**2 (6833)**

**Comment** - EIS001668 / 0003

Where does it go instead?

**Response**

DOE believes the comment refers to alternatives to geologic disposal at Yucca Mountain. As discussed in Section 1.5 of the EIS, the NWPA includes four provisions relevant to the EIS. Under the Act, the Secretary of Energy is not required to consider (1) the need for a geologic repository, (2) the time at which the repository could become available, (3) alternatives to isolating materials in a repository, and (4) any site other than Yucca Mountain for repository development.

**2 (8196)**

**Comment** - EIS001653 / 0112

Furthermore, an EIS can consider other alternatives not specifically authorized by Congress.

**Response**

This comment is correct. However, as discussed in Section 1.5, the NWPA includes four provisions relevant to the EIS. Under the Act, the Secretary of Energy is not required to consider (1) the need for a geologic repository, (2) the time at which the repository could become available, (3) alternatives to isolating materials in a repository, and (4) any site other than Yucca Mountain for repository development.

**2 (8224)**

**Comment** - EIS001873 / 0022

1987 NWP [Nuclear Waste Policy Act] amendments are contrary to the intent of NEPA [National Environmental Policy Act].

**Response**

DOE believes that this EIS appropriately describes the type and magnitude of environmental impacts that could occur if it constructed, operated and monitored, and eventually closed a repository at Yucca Mountain. As discussed in Section 1.5 of the EIS, the NWP includes four provisions relevant to the EIS. Under the Act, the Secretary of Energy is not required to consider (1) the need for a geologic repository, (2) the time at which the repository could become available, (3) alternatives to isolating materials in a repository, and (4) any site other than Yucca Mountain for repository development.

**2 (9052)**

**Comment** - EIS001866 / 0007

The section of the NOI [Notice of Intent] describing the “Proposed Action” (page 9) states -- “Spent nuclear fuel and high-level radioactive waste would be disposed of in the repository in a subsurface configuration that would ensure its long-term isolation from the human environment.” None of the alternatives or options in this NOI would result in isolation of SNF [spent nuclear fuel] or HLW [high-level radioactive waste] from the human environment for the full period of the waste’s hazardous lifetime. Existing and proposed standards and regulations allow for release of radiation, to some extent, during each step in the waste management system. Therefore, since waste isolation will not be achieved by a repository program, No Action should be taken until there is clear, convincing and irrefutable evidence that a waste management system has been designed that will provide permanent isolation.

**Response**

As described in Chapter 1 of the EIS, Congress has determined, through the passage of the Nuclear Waste Policy Act of 1982, that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect the public health and safety and the environment. The Act recognized a need to ensure that spent nuclear fuel and high-level radioactive waste accumulating at commercial and DOE sites do not adversely affect public health and safety and the environment.

Given the current state of technology, it is impossible to design and construct a geologic repository that would provide reasonable assurance or a reasonable expectation that there would never be any releases of radioactive materials. However, DOE would design, construct, operate and monitor, and eventually close a repository that would meet public health and safety radiation protection standards and criteria established by the Environmental Protection Agency (40 CFR Part 197) and the Nuclear Regulatory Commission (10 CFR Part 63).

**2 (9368)**

**Comment** - EIS001888 / 0074

Clark County is joining cities and counties around the country who are starting to define a vision for their future that balances community economic, environment and social well being in order to improve the quality of life of its residents. These “sustainable” communities have developed specific goals and strategies to guide programs and governmental services to achieve this balance and quality of life for the long-term. The goals and visions of these local areas are based on the values and priorities of residents who live there.

A 1999 report by the White House\* argues that the real challenge that the nation faces in the 21st Century is to build “livable cities.” This involves enhancing economic growth, public safety, environmental quality, well being of families, and sense of community. As part of a national initiative, 70% of over 200 communities in the U.S. adopted policies to pursue “livable cities.” Building on the work of the Community Empowerment Board and the President’s Council on Sustainable Development, the Livable Communities Initiative mobilized 12 federal agencies to provide information, tools and monitoring support for community targeted assistance.

From the Federal perspective, the initiative is to broaden choices available to communities in order to sustain prosperity and expand economic opportunity, enhance quality of life, and build a strong sense of community. As part of the Livable Communities Agenda, the federal government has a set of principles that argues that the:

- (1) decisions of how communities grow should be made by the communities themselves;
- (2) appropriate role of the federal government is to inform and assist, not to direct; and,
- (3) federal government should help provide information and tools to help communities anticipate and scope patterns of growth.

These initiatives base their efforts on earlier goals of sustainable development - environmental protection (reduce environmental threats), economic security (build on past investment in communities and broaden the economic base), and social well-being (encourage opportunities for all segments of society). In effect, these initiatives and goals reflect the national policy set forth in 1969 with the adoption of NEPA [National Environmental Policy Act]. The purpose of the act was to:

- Declare a national policy which will encourage productive and enjoyable harmony between man and his environment;
- Promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man;
- Enrich the understanding of the ecological systems and natural resources important to the Nation; and,
- Establish a Council on Environmental Quality [CEQ] (NEPA, 42USC § 4321).

While the language of the statute is very short and general, Congress intended in NEPA:

*To use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.* (NEPA, 42USC § 431(a)).

Clearly, NEPA has resulted in implementation of federal assistance programs to maintain and sustain livable communities. CEQ regulations require federal agencies to comply with the purpose, policy and mandates of NEPA in their planning processes, including the preparation of environmental impact statements and other procedural requirements.

It appears that DOE's proposed repository program with its present insensitivity to local issues is actually working against federal environmental. It is imperative that DOE assure that the Yucca Mountain Program and the description of potential effects from its actions is consistent with national environmental policies.

\*The White House. Building Livable Communities: A report from the Clinton-Gore Administration. Washington, D.C., June 1999.

### **Response**

DOE is familiar with the Livable Communities Initiative and is, in fact, part of it. In the "Building Blocks of the Future, Federal Commitments to Sustainability, National Town Meeting for a Sustainable America" (DIRS 155488-ENN 1999) then-Vice President Gore announced that DOE, in partnership with the Department of the Interior's National Park Service, will support the "greening" of the U.S. National Park System through the use of energy efficiency and renewable energy technologies. The idea is to use clean, cost-effective energy technologies to improve the environmental quality of our parks by reducing air pollution and greenhouse gas emissions, and by replacing conventional sources of power with clean, quiet renewable energy systems. In addition, the use of "green" energy in the Nation's parks will help educate millions of visitors annually to technologies and practices they can employ in their homes, schools, and businesses.

The purpose of the National Environmental Policy Act, as implemented by the Council on Environmental Quality regulations, is to promote an understanding of environmental consequences of Federal actions prior to their implementation. The Act and its implementing regulations do not prohibit activities that might harm the environment; rather, they require Federal agencies to disclose the extent of such environmental harm, and any environmental benefits, to the public and to agency decisionmakers. DOE has modified this EIS to reflect comments received and new information, including that provided by local governments and communities, since the publication of the Draft EIS. DOE believes that the EIS appropriately describes the type and magnitude of environmental impacts that could occur if it was to construct, operate and monitor, and eventually close a repository at the Yucca Mountain site.

**2 (9889)**

**Comment** - EIS001888 / 0439

[Clark County summary of comments it has received from the public.]

Commenters expressed the need for the EIS to identify institutional controls (e.g., markers) that would endure for very long periods of time, particularly given the likelihood that government agencies and the English language may not survive that far into the future. Justification for this endurance, such as would be demonstrated by research on their effectiveness, was requested.

**Response**

Section 2.1.2 of the EIS, and Sections 2.5, 4.1.5, and 4.6 of the Science and Engineering discuss repository closure activities, including the use of institutional controls such as land records and warning systems to limit or prevent intentional and unintentional activities in and around the closed repository. Monuments would be designed, fabricated, and placed to be as permanent as practicable. The analysis of potential environmental impacts in the EIS did not take credit for the effectiveness of these institutional controls. Section 5.7.1 examines the potential environmental impacts that could result from an involuntary human intrusion into the repository (such as a drilling operation). After closure, DOE would have the responsibility of maintaining institutional control over the repository, as required by the Energy Policy Act of 1992. Neither the extent nor the length of this regulatory requirement is well defined at present. However, consistent with Nuclear Regulatory Commission regulations [10 CFR Part 63, particularly Section 63.102(k)], DOE would maintain appropriate institutional control for as long as possible. As the Nuclear Regulatory Commission has noted, although designs can attempt to warn potential intruders or mitigate effects associated with intrusion that does occur, they cannot remove the potential for intrusion to occur (64 *FR* 8651, February 22, 1999).

Nuclear Regulatory Commission regulations [10 CFR 63.51(a)(1) and (2)] require the submittal of a license amendment for permanent closure of the repository. This amendment would have to specifically provide an update of the assessment for the repository's performance for the period after permanent closure, which would include consideration of the use and effectiveness of institutional control. The details of this program would be defined during the development of and approval process for a license amendment for permanent closure. Deferring a description of this program until the closure phase would enable the identification of appropriate technology, including technology that could become available in the future.

**2 (9899)**

**Comment** - EIS001888 / 0446

[Clark County summary of comments it has received from the public.]

Two commenters discussed a 5-step process for solving the nuclear-waste issue: (1) impose a moratorium on all shipments of nuclear waste; (2) establish a commission on nuclear waste; (3) pursue conservation and renewable energy sources and phase out nuclear energy; (4) establish a national nuclear-waste policy that respects the sovereignty of states, counties, and tribes; and (5) pursue an aggressive policy of nuclear-weapons disarmament.

**Response**

The NWPA requires DOE to prepare an EIS to accompany any site recommendation that the Secretary of Energy makes to the President. In compliance, DOE developed this EIS, which analyzes potential environmental impacts of constructing, operating and monitoring, and eventually closing a repository for the disposal of spent nuclear fuel and high-level radioactive waste. The five-step process described in the comment is outside the scope of the EIS.

**2 (9983)**

**Comment** - EIS001888 / 0489

[Clark County summary of comments it has received from the public.]

EIS must assess all subjects mentioned in Title V of the NWPA [Nuclear Waste Policy Act].

**Response**

Title V of the Nuclear Waste Policy Act establishes the Nuclear Waste Technical Review Board. DOE is uncertain of the comment's specific reference with regard to the EIS. The Nuclear Waste Technical Review Board has reviewed and commented on the Draft EIS, and DOE has responded to its comments in this Comment-Response Document.

**2 (10442)**

**Comment** - EIS002125 / 0001

I would like to address the NEPA [National Environmental Policy Act] violations here. We all know that it was a politically motivated thing that brought the Yucca Mountain dump to us.

Even more troubling than the politically based nature of the decision to target Nevada alone for high-level waste is the fact that to ensure approval of the Yucca Mountain site, Congress undermined key provisions of the National Environmental Policy Act with respect to the Yucca Mountain Project. The Nuclear Waste Policy Act as enacted limited the scope and extent of evaluation of potential environmental impacts normally required in an Environmental Impact Statement under NEPA.

Specifically that law exempts the Yucca Mountain Environmental Impact Statement from consideration of the need for repository, alternate sites to Yucca Mountain and alternatives to geologic disposal of high-level waste. In other words, Congress diminished the inherent value of conducting an Environmental Impact Statement in an apparent attempt to rubber stamp NEPA approval on the project.

The proposed Nuclear Waste Act of 1997 contains similar provisions. Knowing this project could never meet radiation guidelines established by the Environmental Protection Agency [EPA] and other regulatory agencies charged with protecting our health, Congress has included in the bill broad sweeping exemptions from local, state or federal environmental oversight of the transportation and storage process. It prevents EPA from creating environmental standards governing the Yucca Mountain site and raises limitations on the amount of radiation in drinking water near Yucca Mountain to a level twenty-five times higher than that of any other state. Obviously we should be following NEPA and the EPA should be leading us that way.

**Response**

In 1987, Congress amended the Nuclear Waste Policy Act by directing the Secretary of Energy to determine whether Yucca Mountain is suitable for a geologic repository, and it eliminated Deaf Smith County, Texas, and the Hanford Site in Washington, from consideration (Nuclear Waste Policy Amendments Act of 1987, Public Law 100-203, 101 stat. 1330).

DOE believes that this EIS appropriately describes the type and magnitude of environmental impacts that could occur if it constructed, operated and monitored, and eventually closed a repository at Yucca Mountain. As discussed in Section 1.5 of the EIS, the NWPA includes several provisions relevant to the EIS. Under Section 114(f) of the Act, the Secretary of Energy is not required to consider (1) the need for a geologic repository, (2) the time at which the repository could become available, (3) alternatives to isolating materials in a repository, and (4) any site other than Yucca Mountain for repository development.

In 1992, Congress further amended the Nuclear Waste Policy Act through the Energy Policy Act which requires the Environmental Protection Agency to promulgate specific radiation protection standards for Yucca Mountain based on and consistent with findings and recommendations of the National Academy of Sciences. In addition, Section 801(b) of the Energy Policy Act of 1992 requires the Nuclear Regulatory Commission to modify its technical requirements and criteria to be consistent with the Environmental Protection Agency's radiation protection standards.

Both the Environmental Protection Agency and the Nuclear Regulatory Commission have issued final rules [40 CFR Part 197, Environmental Radiation Protection Standards for Yucca Mountain, Nevada, and 10 CFR Part 63, Disposal of High-Level Radioactive Wastes in a Proposed Geological Repository at Yucca Mountain, Nevada, respectively].

**2 (10473)**

**Comment** - EIS001835 / 0002

Regarding the draft environmental impact statement meeting the requirements of the National Environmental Policy Act, NEPA as it's often called, it does indeed effectively satisfy the requirements of NEPA. I'm going to quote a few sections from the Nuclear Waste Policy Act regarding NEPA's application to this project.

Section 114 F states that the final environmental impact statement will accompany a recommendation to the President to approve a site for a repository. And in fact this draft is the first step in that process, and DOE will issue a final impact statement sometime later this year after they take into consideration all the comments that they're hearing today and in all the other meetings across the country.

Compliance with the procedures and requirements of the Nuclear Waste Policy Act shall be deemed adequate consideration of the need for a repository, the time of initial availability of a repository and all alternatives, the isolation of high-level waste [and] spent nuclear fuel in a repository. For the purposes of complying with the requirements of NEPA and Section 114 of the Nuclear Waste Policy Act -- I know it's dry, this is regulatory language -- the secretary need not consider alternative sites to [the] Yucca Mountain site for the repository to be developed.

And the reason that this was put in the Nuclear Waste Policy Act to specifically limit the NEPA analysis and what DOE needed to consider in a Draft Environmental Impact Statement and the final environmental impact statement is because the federal government, DOE looked at those issues in 1980 when they issued a draft environmental impact statement and FEIS for the management of commercially generated radioactive waste. And in 1981 they issued a record [of] decision in which the federal government opted for more geologic disposal. This is the next step in our process.

**Response**

Thank you for your comment. DOE appreciates your understanding of the National Environmental Policy Act as specified in the NWPAct.

**2 (11188)**

**Comment** - EIS000248 / 0003

A combination of natural geological and engineered barriers would prevent the release of radioactive materials back into the biosphere. These barriers include the use of fuel itself, which is a surround of material, which is designed to maintain its integrity and be leach resistant under [severe] conditions; such as heat, radiation, and chemicals that are anticipated in the repository.

Second barrier is the waste packaging, which is designed to isolate the used fuel material from the host media. This is a robust stainless steel canister. The host crop [rock] then isolates the nuclear fuel from groundwater and limits the rate [at] which release of material can migrate from the replacement [repository] site. And the shaft will be sealed after the site has been closed to prevent intrusion of [the] surface against humans. Finally a monitoring system will be in place to verify the integrity of this site after closure.

**Response**

DOE is designing the proposed repository to use natural and engineered barrier systems that would ensure the containment of radioactive contamination for as long as possible. DOE believes it can design a containment system that the Nuclear Regulatory Commission will find, with "reasonable expectation," would protect public health and safety and the environment.

**2 (12021)**

**Comment** - EIS000540 / 0012

Recognizing that alternative means must be fully explored for managing and disposing of high-level nuclear wastes to minimize health and safety risks for current and future generations.<sup>(1),(2)</sup>

<sup>(1)</sup>Makhijani A. Considering the Alternatives: Creating a framework for sound long-term management of highly radioactive wastes in the United States. Institute for Energy and Environmental Research. Science for Democratic Action, vol. 7 no. 3, April 1999.

<sup>(2)</sup>Makhijani A. Institutional Reform for Long-Term Nuclear Waste Management. Institute for Energy and Environmental Research. Science for Democratic Action, vol. 7 no. 3, April 1999.

**Response**

In a 1980 EIS, DOE examined different disposal alternatives for spent nuclear fuel and high-level radioactive waste, including mined geologic disposal, as well as disposal in salt domes, on islands, in oceanic trenches, within ice sheets, by transmutation, by injection into deep holes, and by launching the waste into space. The Department determined in a Record of Decision for that EIS (46 FR 26677, May 14, 1981) that it would pursue mined geologic disposal. As stated in Section 2.3.1 of this EIS, virtually every expert group that has looked at the nuclear waste problem has agreed that a geologic repository is the best approach for nuclear waste disposal. A panel of the National Academy of Sciences noted in 1990 that there is a worldwide scientific consensus that deep geologic disposal is the best option for disposing of high-level radioactive waste (DIRS 100061-National Research Council 1990). This conclusion was recently affirmed in the May 2001 Report *Disposition of High-Level Waste and Spent Nuclear Fuel: The Continuing Societal and Technical Challenges* (DIRS 156712-National Research Council 2001).

**2 (12042)**

**Comment** - EIS000540 / 0016

Urge Congress to financially support research for alternative methods to safeguard and manage the Nation's high-level nuclear waste and minimize the risks to public health for all generations.\*

\*Olson M, Piersma A. A Letter to Bill Richardson, Secretary of Energy. Signed by 219 environmental and consumer organizations. Washington, DC, November 19, 1998.

**Response**

As discussed in Chapter 9 of the EIS, DOE continues to evaluate new technologies (such as accelerator transmutation of waste) to reduce any potential adverse effects of the repository project by reducing volume and toxicity of waste that would ultimately require geologic disposal. However, the NWSA does not allow DOE to pursue such research as a substitute for developing a repository.

**2 (13237)**

**Comment** - 010244 / 0036

Under the DEIS and S&ER designs, the performance confirmation program which would continue through construction and license phases and until the closure phase would include elements of the site testing, repository testing, repository subsurface support facilities and waste package testing. The DOE should confirm performance of the repository prior to the siting of radioactive waste at Yucca Mountain.

**Response**

Consistent with the NWSA, DOE began site characterization activities to evaluate the suitability of the Yucca Mountain site for the location of a repository. As such, site characterization included activities the Secretary of Energy considered necessary to provide the data required for evaluation of the suitability of the site for submittal of an application to the Nuclear Regulatory Commission for a construction authorization for a repository. The Secretary will consider the information from the site characterization program, as well as the results of the environmental analyses of this EIS and public input, in determining whether to recommend development of the site to the President as a geologic repository.

The performance confirmation and testing program is an important part of the strategy for the development of the postclosure safety case for the proposed repository (DIRS 146976-CRWMS M&O 2000) and is designed to meet

specific regulatory requirements [10 CFR 63.102(m) and 10 CFR Part 63, Subpart F]. As defined, the program would consist of tests, experiments, and analyses to evaluate the adequacy of the information used to demonstrate compliance that the repository would meet performance objectives. The description of the performance confirmation and testing program is formally documented in the *Performance Confirmation Plan* (DIRS 146976-CRWMS M&O 2000) and described in Section 2.1.2.3 of the EIS. In accordance with applicable regulations, the performance confirmation period started during site characterization would extend until the beginning of repository closure activities, as discussed in Section 2.1.2 of the EIS. Key geologic, hydrologic, geomechanical, and other physical processes or factors (and related parameters) would be monitored and tested throughout repository construction, emplacement, and operation to detect any significant changes from baseline conditions. DOE would use these data to confirm that subsurface conditions were consistent with the assumptions used in performance analyses and that barrier systems and components operated as expected.

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